

United States Department of Agriculture,

DIVISION OF ENTOMOLOGY.

THE ARMY WORM.

(*Leucania unipuncta* Haw.)

GENERAL APPEARANCE AND METHOD OF WORK.

In the months of May and June, and sometimes as late as July, wheat, oats, and other small grains, corn, timothy, blue grass, and other grasses, but seldom or never clover, are occasionally overrun by multitudes of naked striped caterpillars about an inch and a quarter long and a quarter of an inch in diameter, when full-grown, rather dark in appearance and closely resembling Fig. 1. They usually travel in one direction from one field to another, destroying the crop as they go. They have a habit of climbing the seed stalks and cutting off the heads of timothy grass and of the small grains.

DISTRIBUTION.

The army worm seems to be an indigenous North American insect, and on this continent is most abundant in the United States east of the Rocky Mountains. Isolated specimens have been found in England and South America, and the moth has been captured in India, Java, Australia, and New Zealand. It is nowhere known as an especially destructive species, however, outside of the United States. The region in which it especially flourishes extends from eastern Iowa to Maine and from northern Texas to northern Alabama. East of the Blue Ridge Mountains its southerly range as an injurious species extends only to northern North Carolina. The moth is often captured outside these limits and frequently in considerable numbers, but the caterpillar does not seem elsewhere to be a factor in agriculture.



FIG. 1.—THE ARMY WORM: Full-grown larva; natural size. (From Comstock.)

NATURAL HISTORY AND HABITS.

The adult insect is a brown moth with a white spot on the center of each fore-wing, as indicated at Fig. 2. The eggs are very minute and white in color, round, and are laid in strings of from 2 or 3 to 15 or 20. They are pushed by the ovipositor of the female moth down into the inner base of the terminal leaf sheaths of grasses or grains. (See also Fig. 2.) A strong effort is apparently made by the female moth to conceal them. They are laid most abundantly in the thickest tufts of grass which customarily spring up in pastures over spots where cattle have dropped. In the vicinity of old fodder stacks the grass usually grows high, and this also is a favorite place for egg-laying. The moths do not confine their egg-laying operations to such localities, however, and the eggs have been found in old cornstalks, thrust under the sheath, and even under the bark of old cedar posts.

The eggs are hatched in from eight to ten days and the young caterpillars feed for a time in the fold of the leaf, growing rapidly, and finally consuming entire leaves.

Under ordinary circumstances, and when not present in great numbers, the larvæ feed mainly at night and in damp cloudy weather, remaining hidden during sunshiny days. In this respect they resemble in habits the closely allied cutworms. They reach

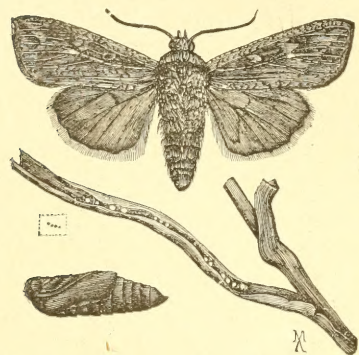


FIG. 2.—THE ARMY WORM (*Leucania unipuncta*): Moth above, pupa below, and eggs in natural position in a grass leaf—all natural size. (From Comstock.)

full growth in three or four weeks, burrow into the ground, and transform to the brown pupæ shown at Fig. 2. In this condition they remain in the summer time on an average about two weeks, when the moth again appears.

The number of generations each year varies with the climate and the season. There are, in the more northern States, two or three generations, and perhaps six in the more southern States.

We have said above that the insect normally feeds by night and hides by day, and to this habit is due the fact that, although the army worm is present every year all through the region especially indicated in a previous paragraph, it is only noticed when it becomes excessively abundant, and this occurs usually only at intervals of several years.

With a favorable succession of seasons the insect multiplies in geometrical ratio, and at last becomes so numerous as to necessitate migration for food. It then travels and feeds during both day and night, and it is then that the insect becomes very injurious and that reports of great damage are heard.

The insect passes the winter normally, as do most of the related cutworms, in the half-grown caterpillar or larval condition. In the South

it also undoubtedly hibernates as a moth, and there is some evidence that it may pass the winter occasionally, although exceptionally, in the egg state.

The injurious brood may be the first, second, or third. The overwintered larvæ may occasionally be so abundant as to attract notice, but in the majority of cases it is the offspring of these overwintered individuals which cause alarm.

In general it may be said that the worms are more apt to make an injurious appearance in a rainy spring or early summer following a season of comparative drouth. The present season (1894) bears out these conditions in the Eastern States, and as a matter of fact the army worm has been more abundant in certain eastern sections than it has been since 1888.

REMEDIES AND PREVENTIVE MEASURES.

There is never any demand upon this office for remedies for the army worm until it is almost too late to do any immediate good. There are certain old-time measures which may be adopted to protect certain fields from advancing armies, like the plowing of a furrow with its perpendicular side toward the field to be protected and the subsequent dragging of a log through the furrow to keep the earth friable and kill the worms which have accumulated in the ditch, and another is the sprinkling of a strip of pasture or field crop in advance of an army with Paris green or London purple in solution. In fields which the caterpillars have already entered there is little which can be done for their destruction which does not also involve the destruction of the crop. The fields may be sprinkled by means of a broadcast sprayer with an arsenical solution, or they may be rolled with a heavy roller where one is at hand and the ground is level, or a flock of sheep may be sent in, which will result in crushing most of the worms by trampling.

In the great majority of cases, however, these latter measures are unnecessary, for the reason that nature herself almost always takes a hand in the reduction of the excessive numbers of the insect, either by unfavorable weather conditions or by the excessive multiplication of natural enemies and parasites, so that it is extremely rarely that we hear of one army-worm outbreak immediately following another.

In general, therefore, it may be said that, as soon as the worms are discovered to be exceptionally numerous in a given field (and, as a matter of fact, they are at first almost invariably restricted to the immediate neighborhood of some definitely limited, permanent breeding place), all energies should be devoted to the protection of the surrounding crops by the means mentioned above, and the destruction of the worms in the fields first attacked may be safely left to the last.

There are many localities in which the army worm is never seen, or, rather, is never known to be injurious, and these localities owe their exemption undoubtedly to the unconscious use of preventive meas-

ures. Clean cultivation, rotation of crops, cleaning up fence corners, close pasturage, the burning over of waste grass land in spring or fall are all preventive measures of great value, since, where these methods are in vogue, the army worm will never be able to get a migratory start, or, in other words, it never becomes so abundant as to necessitate migration.

Bearing in mind the fact that the insect breeds normally in rank grass, such as is usually found along the edges of swamps (not *in* swamps, for the insect must have comparatively dry earth in which to pupate) or in accidentally overfertilized spots in pasture lands, and that it feeds normally only upon true grasses, the farmer who has once suffered from army-worm attack may easily prevent its recurrence by winter burning or by rotation and clean cultivation.

In cases where the worms have already entered a valuable field of wheat before the farmer has become aware of their presence, and too late to render ditching of any avail, some little good may be accomplished if the majority of the worms are full grown, or nearly full grown, by the old method of "dragging the rope." Two men, each having hold of the end of a long rope, are sent through the field and the rope is dragged over the heads of the grain. The backward jerk of the stalks jars the caterpillars to the ground, and they are unable to ascend to the heads again for some little time. This is a laborious process, however, and has to be repeated almost immediately. It is only to be undertaken where the number of worms in a field is comparatively small and where these are, as before stated, full grown or nearly full grown, since in this case they will stop feeding and enter the ground in a day or two.

NATURAL ENEMIES.

There is almost no prominent injurious insect in whose economy natural enemies play a more important part than the army worm. We have said above that in the great majority of cases actual destructive measures against army worms which have once taken full possession of a grass field are hardly necessary. This is because of the fact that generally not more than one worm out of a thousand escapes death from parasitic or predaceous insects. Where the army worm follows its normal habit and feeds only at night, remaining hidden during the day under the surface of the ground at the base of some tuft of rank-growing grass, it is protected from these natural enemies, but when the migratory instinct drives it forth and perverts its normal habit, causing it to march unprotected during the day, the swift-breeding tachina flies attack it at once, multiply most rapidly, and in connection with its other parasites and with the predatory ground-beetles, reduce its numbers once more to the noninjurious point. We have said this is generally the case; there may be exceptions, but we have never seen one. It is important, however, for the farmer to be able to recognize

the appearance of a parasitized worm, as in this way his confidence in the future may be restored.

We show at Fig. 3 the head and front segments of an army worm bearing eggs of the red-tailed tachina-fly (*Nemoræa leucaniæ*). The eggs are white, oval, less than one-sixteenth of an inch long, and are glued fast to the skin of the caterpillar, usually on the back of the front segments. From half a dozen to fifty or more of these eggs may be attached to a single caterpillar, and from each hatches a maggot which penetrates the body of the army worm and ultimately destroys it, unless the caterpillar should happen to cast its skin so soon after the eggs are laid that they do not have time to hatch. The adult tachina-fly resembles a rather large house-fly, except that it has a red tip to its abdomen. Hundreds and thousands of these flies are usually seen buzzing about a field infested by the army worm, and their presence should be welcome to the farmer.

The extent of the parasitism of the injurious brood of the army worm may be indicated by two instances from our personal experience. In 1880 we visited a large tract of land planted in timothy grass, in the vicinity of Portsmouth, Va. A search for hours during the hot part of the day failed to show a single worm which did not bear tachina eggs. In 1882 we visited wheat fields in the vicinity of Huntsville, Ala., which were then being overrun by this insect. Here, although a number of worms were noticed which did not bear tachina eggs, they were destroyed by ground-beetles to such an extent that when we attempted to catch an adult moth a little later in the season by means of trap lanterns and sugar, we were unable to secure a single specimen. The entire army had been annihilated, and it is worthy of remark that in neither of these localities has the army worm ever been seen since in injurious numbers, although fourteen years have elapsed in the one case and twelve in the other.

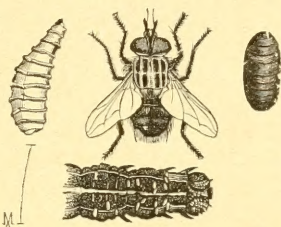


FIG. 3.—THE RED-TAILED TACHINA-FLY, with its larva at left and its puparium at right; below is the fore part of the body of an Army Worm with Tachina eggs attached, somewhat enlarged. (From Comstock.)

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Approved:

J. STERLING MORTON,
Secretary.

WASHINGTON, D. C., June 16, 1894.



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